a period of six years, accompanied by drawings of the more remarkable objects.

The principal results seem to be a large addition to the list of nebulæ with curved or spiral branches, and many new double and multiple nebulæ. A variety of objects have been also pointed out upon which the labour of a careful scrutiny will probably be amply repaid, with a similar instrument, even in this climate. A still larger number have been marked off, which to save time may be passed by, unless some new views on Cosmogony should suggest sufficient motives for reobserving them. A record has been made, which, to some extent, will be available hereafter for comparison with the heavens, and a few cases of suspected change have been noticed, where the evidence, however, is by no means conclusive.

XVIII. "Observations on the Posterior Lobes of the Cerebrum of the Quadrumana, with a Description of the Brain of a Galago." By WILLIAM H. FLOWER, Esq., Demonstrator of Anatomy at the Middlesex Hospital. Communicated by Dr. SHARPEY, Sec. R.S. Received June 20, 1861.

(Abstract.)

After referring to the present state of our knowledge upon the subject, and especially to the descriptions recently given of the "posterior cornu of the lateral ventricle" and "hippocampus minor" in the Orang-Utang by Dr. Rolleston, in the Chimpanzee by Mr. Marshall, and in *Ateles* by Mr. Huxley, and the statements of M. Gratiolet, that the posterior cornu of the lateral ventricle or "*cavité ancyroïde*" obtains an enormous development in Monkeys, the author proceeds to detail his own observations (which are illustrated by drawings and photographic representations) upon the condition of these parts in the brains of animals belonging to the three families of the order *Quadrumana*.

Family 1. CATARRHINA.

Orang-Utang (*Pithecus satyrus*).—An account is given of the examination of the brain of a young female of this species, preserved in the Middlesex Hospital Museum. The posterior lobes of the cerebral hemispheres were so far developed that they completely covered the cerebellum, although not prolonged backwards to quite

so great an extent as in the human brain. To examine the interior, the right hemisphere was removed to the level of the inferior surface of the corpus callosum, and then further portions were carefully dissected away, so as to expose the lateral ventricle, with its three cornua and their contained structures. It is to be observed that brains which have been long in spirit are in some respects not so well adapted for dissection as when in a recent condition, as the distinction in appearance between the white and grey substance is lost, and the contiguous walls of cavities, which in the natural state would have fallen apart, have now become hardened in such close contact, that their real nature may readily be overlooked. In this way only can the statements of Tiedemann as to the absence or rudimentary condition of the posterior cornu in the Simiæ be accounted for. However, the brain of this Orang is sufficiently well preserved to show that its ventricular cavity presents almost the exact counterpart of that in the human subject. The posterior cornu extends quite as far backwards as in an average example in man, its apex being but $\frac{3}{8}$ of an inch ($=\frac{1}{8}$ of the entire length of the hemisphere) from the occipital extremity of the hemisphere; and its direction well answers to the description "backwards, outwards, and then inwards." Upon the inner wall of the cavity is the hippocampus minor, which will bear comparison with a very well-developed specimen of this structure as met with in the human brain, where, as is well known, it is subject to great variations in size and form. Its length is $\frac{5}{8}$ inch, its breadth at the base $\frac{3}{16}$ inch. The portion of the wall of the ventricle situated opposite the junction of the descending and posterior cornua (called eminentia collateralis or pes accessorius) corresponds in configuration and relative size to the similar part in the brain of man. The hippocampus major has no distinct digital marks; these are, however, indicated by a nodulated appearance in the expanded termination. The remaining portion of the ventricle presented nothing requiring special remark. In order to verify these observations by an examination of the corresponding parts of the opposite side, the upper part of the left hemisphere was also removed, and a very good view obtained of the ventricle, with its posterior cornu. It was precisely similar to that just described, the two sides exhibiting in their internal structure a perfectly symmetrical appearance.

Cercopithecus.—Four examples of this genus which have lately died at the Gardens of the Zoological Society were examined while in a recent condition. The first was *C. pygerythrus* (the Vervet Monkey). In order that the brain might be examined *in situ*, the right side of the cranium was removed in the following way. First, a longitudinal incision was made with the saw a quarter of an inch to the right of the middle line, from the supraorbital ridge to the foramen magnum; then with the bone forceps the whole of the cranial wall thus marked out, was carefully cut away down to the base, as were also the right halves of the three upper cervical vertebræ. The dura mater being then removed, a photograph was taken, in which the relative position of the different parts of the brain are well seen. The posterior lobes of the cerebrum project to the extent of $\frac{1}{4}$ inch beyond the cerebellum, covering it more completely than in the Orang, and nearly, if not quite, as much so as in man. The upper part of the remaining portion of the calvarium was now removed, a section made across the hemispheres at the level of the lower surface of the corpus callosum, and the lateral ventricles opened out on both sides. Although in general form and in the arrangement of the structures composing their walls these cavities present a great resemblance to those of the human brain, one remarkable peculiarity immediately strikes the observer, viz. the great development of the posterior cornu, with the contained hippocampus minor. It extends from the commencement of the descending cornu to near the apex of the well-developed posterior lobe, is of considerable vertical depth, being curled round the voluminous projection of the hippocampus minor, and is directed at first somewhat outwards and backwards, then directly backwards, and finally takes a considerable sweep towards the middle line,—the characteristic form which has obtained for this part in man the name of "digital cavity." The hippocampus minor is formed, as in the human brain, by the deep involution of a layer of superficial grey cerebral matter, covered internally by a layer of white substance, which is so thin that the surface of this prominence had a darker look than the other parts of the ventricular walls. It differs from a typical example of the corresponding part in the human subject in its great relative size, both as to length and as to the extent to which it projects into the ventricle. The hippocampal sulcus (well marked on the inner

surface of the posterior lobe of all apes) is not only very deep, but has concealed within it a convolution of considerable size, in the form of a longitudinal eminence attached to the floor of the fissure. The eminentia collateralis is prominent. The hippocampus major is smooth upon the surface. The anterior cornu is of the same form and extent as in the human brain.

In the brains of *C. sabæus*, *C. mona*, and *C. ruber* a similar disposition of these parts was found. In the last named, the posterior lobe of the cerebrum is even more prominent, and the hippocampus minor of still greater size, as it tapers less towards its termination; in fact this eminence is here actually larger than the hippocampus major, to which its true relation can be better studied in these apes than in man.

Macacus.—In a monkey of this genus (*M. erythræus*) the posterior cornu and hippocampus minor were observed to obtain almost as large a development.

Family 2. PLATYRRHINA.

In *Cebus apella*, the ventricular cavity resembles in all essential particulars that of *Cercopithecus*. There is the same extent of posterior cornu and the same complex arrangement of anfractuosities, producing the very protuberant hippocampus minor.

It is among the members of this family (e. g. *Saimiris*) that the projection backwards of the posterior lobes of the cerebrum attains its greatest extent.

Family 3. STREPSIRHINA.

The cerebral anatomy of the Lemurs is still imperfectly known; therefore a detailed description is given in the paper of the brain of a species of *Galago*, the most important part of which is the following note upon its internal structure:—"A horizontal section of both hemispheres was made at the level of the corpus callosum, and the lateral ventricles laid open. A broad and very distinct posterior cornu extends backwards almost to the extremity of the hemisphere, occupying nearly the whole of the posterior lobe. Its floor and inner wall are raised into a prominence, having distinctly the characters of the hippocampus minor as found in man and the higher Quadrumana, and corresponding with the bottom of the sulcus before noted on the under surface of the lobe. The form of this eminence is somewhat triangular, the apex being directed backwards; but the surface

is convex, both from above downwards, and in the antero-posterior direction, so that the axis of the cavity that contains it, though directed generally backwards, has first an outward inclination, and finally turns somewhat inwards. The anterior or broad end of the eminence is concave, being adapted to the curved posterior margin of the hippocampus major, from which it is separated by a deep groove. The length of the hippocampus minor is $\frac{1}{4}$ of an inch, its breadth at the base almost as much. The outer wall of the ventricle has a distinct projection into the angle between the hippocampi, nearly corresponding with the 'eminentia collateralis' of the human brain. On comparing the posterior lobe and hippocampus minor in *Galago* with the same parts in the true apes (e. g. *Cercopithecus*), it is seen that though the anterior part is proportionally as broad, the length is considerably diminished; the portion that is wanting being equivalent to that part which, in the apes, covers the posterior third of the cerebellum, and projects beyond it."

As none of the authors who have written upon the brains of the Lemuridæ describe a hippocampus minor, as Vrolik expressly states that it is absent in *Stenops*, and as Burmeister alone assigns a posterior cornu to the ventricle (in *Tarsius*), it seemed desirable, after the results of the observation of these parts in *Galago*, to re-examine the brain of some other members of the family. Two specimens in spirit of *Loris* (*Stenops*) *Bengalensis*, placed at the author's disposal for this purpose by Dr. Grant, afforded distinct evidence of the existence of a well-developed posterior cornu and hippocampus minor, though unfortunately in neither instance were the brains in sufficiently good preservation to allow of a satisfactory description or figure of the parts being made.

Galago and *Stenops* being generally considered as not very elevated forms in the Lemurine family, we can have but little doubt as to the presence of the posterior cornu and hippocampus minor throughout the different members of the group, and hence a most important character is supplied for determining the affinities of these interesting animals. It indicates as decisively their position among the Quadrumana, as it separates them completely from the Insectivora, in which order some naturalists have placed them.

Many links are still wanting in the chain of evidence required to determine the true history and classificatory value of the posterior

horn of the lateral ventricle, and the peculiar disposition of cerebral substance constituting the hippocampus minor, but the conditions in which they have been found at so many distinct points of the series, appear to lead almost irresistibly to the following conclusions:—

1. That these parts, so far from being (as has been stated by some anatomists) peculiar to the human brain, are common to man and the whole of the Quadrumana, including even the lowest forms.

2. That they attain their maximum of development in species which do not belong to either extremity of the series.

3. That in the lower forms their diminution takes place chiefly in the antero-posterior direction, corresponding with the reduced length of the posterior cerebral lobes, the greater part of which is occupied by them.

4. That in the higher forms they are narrower in proportion to their length, and bear a smaller ratio to the surrounding mass of cerebral substance.

5. That the extreme of the last condition is met with in man, where these parts are also characterized by their variability in size and form, want of symmetry on the two sides, and frequent rudimentary condition, or even entire absence.

XIX. "On Liquid Transpiration in relation to Chemical Composition." By THOMAS GRAHAM, Esq., V.P.R.S., Master of the Mint. Received June 20, 1861.

(Abstract.)

In accordance with the analogy of the transpiration of gases, the passage of liquids under pressure through a capillary tube is spoken of as liquid transpiration. The subject owes the development which it has already attained chiefly to the investigations of M. Poiseuille. The precision of the mode of experimenting pursued by that physicist has been remarked on by every one who has engaged in the inquiry. The same method was accordingly adopted with little variation in the present investigation.

The isolated observation made by M. Poiseuille, that alcohol diluted to different degrees is most retarded in passing through a capillary tube at that degree of dilution where the greatest condensation of the mixed liquids occurs, was understood by the author as indicating that the definite hydrate of alcohol containing six equiva-